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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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ARENT FOX LLP 1050 CONNECTICUT AVENUE, N.W. SUITE 400 WASHINGTON, DC 20036			EXAMINER KESSLER, CHRISTOPHER S	
			ART UNIT 1793	PAPER NUMBER
			NOTIFICATION DATE 12/12/2007	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/525,225	Applicant(s) OHMI ET AL.	
	Examiner Christopher Kessler	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 September 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status of Claims

1. Responsive to the amendment filed 18 September 2007, Claim 1 is amended and claim 8 is canceled. Claims 1-7 are currently under examination.

Status of Previous Rejections

2. The amendment to claim 1 requires new grounds for rejection, stated below.

Claim Rejections - 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
4. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Haller in view of ASM Handbook.

Haller teaches a method for producing a metal formed article comprising the steps of burying a formed article comprising a metal in a powder of another metal, and forming a powder formed article (see cols. 1-2, or claim 1). Haller teaches that the step comprises heating such that the buried article substantially melts and infiltrates the first metal (see cols. 1-2, or claim 1). Haller teaches wherein a space is formed in the region where the second metal was, and wherein the powder is sintered and solidified (see cols. 1-2, Figures 1-7, or claim 1).

Haller does not teach wherein the second metal is a linear metal having a sectional shape with diameters in the range of 50 to 500 μm .

However, the changes in the size and shape of the second metal would not materially change the results or function of the process. It would have been obvious to one of ordinary skill in the art that by using a second material of a linear shape with a diameter as claimed, the resulting product would have had a cavity matching the second metal component. Applicant is further directed to MPEP 2144.04.

Haller does not teach wherein the powder formed article is heated to at least a melting point of the second metal at a temperature rising rate of 1 kelvin/second or more.

ASM Handbook teaches methods employed by those of ordinary skill in the art (see p. 565). ASM Handbook teaches that liquid phase sintering can result in higher densification rates and lower sintering temperatures (see p. 565). ASM Handbook further teaches that the process of transient liquid phase sintering is highly sensitive to processing conditions such as heating rate (see p. 571). It would have been obvious to one of ordinary skill in the art at time of invention to have employed the method of Haller as stated above, and to optimize the heating rate, because ASM Handbook teaches that transient liquid phase sintering is "highly sensitive" to heating rate (see p. 571).

5. Claims 1, 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Umehara in view of ASM Handbook.

Umehara teaches a method for producing a metal formed article comprising the steps of burying a formed article comprising a metal in a powder of another metal, and forming a powder formed article (see cols. 3-6, claim 1). Umehara teaches that the step

comprises heating such that the buried article melts and infiltrates the first metal (see cols. 3-6, Figs. 7-8, claim 1). Umehara teaches wherein a space is formed in the region where the second metal was, and wherein the powder is sintered and solidified (see cols. 3-6).

Umehara further teaches wherein the first metal is copper and the second metal is an alloy of tin (see claims 1 and 4).

Umehara does not explicitly teach wherein the first metal and second metal form an alloy. Umehara teaches that the infiltrant provides strengthening and reinforcing of the matrix (see col. 7). Thus, the formation of a new alloy coating is inherent in the process of Umehara. Applicant is further directed to MPEP §2112.01.

Umehara does not teach wherein the second metal is a linear metal having a sectional shape with diameters in the range of 50 to 500 μm .

However, the changes in the size and shape of the second metal would not materially change the results or function of the process. It would have been obvious to one of ordinary skill in the art that by using a second material of a linear shape with a diameter as claimed, the resulting product would have had a cavity matching the second metal component. Applicant is further directed to MPEP 2144.04.

Umehara does not teach wherein the powder formed article is heated to at least a melting point of the second metal at a temperature rising rate of 1 kelvin/second or more.

ASM Handbook teaches methods employed by those of ordinary skill in the art (see p. 565). ASM Handbook teaches that liquid phase sintering can result in higher

densification rates and lower sintering temperatures (see p. 565). ASM Handbook further teaches that the process of transient liquid phase sintering is highly sensitive to processing conditions such as heating rate (see p. 571). It would have been obvious to one of ordinary skill in the art at time of invention to have employed the method of Umehara as stated above, and to optimize the heating rate, because ASM Handbook teaches that transient liquid phase sintering is "highly sensitive" to heating rate (see p. 571).

6. Claims 1, 2, 3 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Park in view of ASM Handbook.

Park teaches a method for producing a metal formed article comprising the steps of burying a formed article comprising a metal in a powder of another metal, and forming a powder formed article (see pp. 3-9). Park teaches that the step comprises heating such that the buried article melts and infiltrates the first metal (see pp. 3-9). Park teaches wherein a space is formed in the region where the second metal was, and wherein the powder is sintered and solidified (see pp. 3-9).

Park further teaches wherein the first metal may be iron and the second metal may be aluminum (see p. 4).

Park further teaches wherein the first metal and second metal form an alloy (see pp. 3-9). Park further teaches that the infiltrated metal seals the part (see pp. 3-9), meeting the limitation of forming a coating.

Park does not teach wherein an intermetallic coating is formed. However, Park teaches that when the first metal is iron, and the second metal is copper, an alloy is formed (see pp. 3-9). Park teaches that aluminum can be used as the second metal (see pp. 3-9). Thus, the formation of a coating composed of an intermetallic would be inherent in the process of using iron as the first metal and aluminum as the second metal. Applicant is further directed to MPEP §2112.01.

Park does not teach wherein the second metal is a linear metal having a sectional shape with diameters in the range of 50 to 500 μm .

However, the changes in the size and shape of the second metal would not materially change the results or function of the process. It would have been obvious to one of ordinary skill in the art that by using a second material of a linear shape with a diameter as claimed, the resulting product would have had a cavity matching the second metal component. Applicant is further directed to MPEP 2144.04.

Park does not teach wherein the powder formed article is heated to at least a melting point of the second metal at a temperature rising rate of 1 kelvin/second or more.

ASM Handbook teaches methods employed by those of ordinary skill in the art (see p. 565). ASM Handbook teaches that liquid phase sintering can result in higher densification rates and lower sintering temperatures (see p. 565). ASM Handbook further teaches that the process of transient liquid phase sintering is highly sensitive to processing conditions such as heating rate (see p. 571). It would have been obvious to one of ordinary skill in the art at time of invention to have employed the method of Park

as stated above, and to optimize the heating rate, because ASM Handbook teaches that transient liquid phase sintering is "highly sensitive" to heating rate (see p. 571).

7. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Haller in view of ASM Handbook as stated above, further in view of Sachs.

Haller in view of ASM Handbook is applied to the claim as stated above. Haller does not teach wherein the second metal is Si. Haller teaches that other metals may be used in the invention (see cols. 3-4).

Sachs teaches a method of infiltrating a nickel alloy with a reduced melting point into a body of sintered nickel (see Abstract). Sachs teaches that this method avoids disadvantages in lower melting point infiltrants such as certification issues and corrosion issues (see paras. [0001]-[0005]). Sachs further teaches that silicon is added to the nickel to achieve the lower melting point (see claim 5, paras. [0006]-[0008]).

It would have been obvious to one of ordinary skill in the art at time of invention to further alter the method of Haller by using nickel as the first metal and a silicon alloy as the second metal, as taught by Sachs (cited above), in order to create a part free from issues related to a lower melting point infiltrant material, as taught by Sachs (cited above).

8. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Haller in view of ASM Handbook as applied to the claims above, further in view of Kawano.

Haller in view of ASM Handbook is applied to the claim as stated above. Haller does not teach wherein the first metal is Al and the second metal is Zn. Haller teaches that other metals may be used in the invention (see cols. 3-4).

Kawano teaches a method of preparing large size iron parts by powder metallurgy including vibratory charging and inclusion of aluminum powder to minimize shrinkage (see cols. 7-9). Kawano further teaches that an infiltrating metal is applied, which may be zinc (see cols. 10-11, claim 17). Kawano teaches that the surface roughness of parts produced in this way is improved (see cols. 1-2).

It would have been obvious to one of ordinary skill in the art at time of invention to further alter the method of Haller by including aluminum powder in the first metal and zinc as the infiltrating metal, as taught by Kawano (cited above), in order to improve the surface roughness, as taught by Kawano (cited above).

Response to Arguments

9. Applicant's arguments filed 18 September 2007 have been fully considered but they are not persuasive.

Applicant argues that ASM Handbook is not applicable to the invention because ASM Handbook teaches liquid phase sintering while the instant invention teaches infiltration of one metal into another. In response, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned,

in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, it would have been obvious to one of ordinary skill in the art that liquid phase sintering occurs during the infiltration process as claimed, and thus ASM Handbook is applicable.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher Kessler whose telephone number is (571) 272-6510. The examiner can normally be reached on Mon-Fri, 9-5.

Application/Control Number:
10/525,225
Art Unit: 1793

Page 10

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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